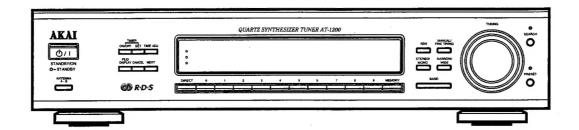


AKAI-01217

# AKAI SERVICE MANUAL



### FM/MW/LW STEREO TUNER

### **SPECIFICATIONS**

**MODEL AT-1200** 

FM		LW
Frequency Range	: 87.50 MHz ~ 108.00MHz (50kHz Step: Manual) (10kHz Step: Fine)	Frequency Range : 146kHz ~ 290kHz (1kHz Step: Manual) (9kHz Step: Auto)
Usable Sensitivity (	S/N 30dB): 1.2μV	Usable Sensitivity (S/N 20dB): 60dB S/N Ratio : 45dB
Total Harmonic Dis MONO STEREO	: 0.08%	Total Harmonic Distortion (400Hz): 1%
S/N Ratio(IHF) MONO	: 80dB	MW
STEREO	: 75dB	Frequency Range : 522kHz ~ 1620kHz (9kHz Step)
Frequency Respons	+0.5 ~ -3.0dB	Usable Sensitivity (S/N 20dB): 50dB
AM Suppression	: 60dB	S/N Ratio : 45dB
Separation(1kHz)	: 50dB	Total Harmonic Distortion(400Hz): 0.8%
GENERAL		Standard accessories
Power supply	: AC 230V, 50Hz	Audio Signal connection cord · · · · · · · ·
Power consumptio	n : 9W	Remote control connection cord·····
Dimensions(W×H×	D): 430×96×336mm	FM Antenna · · · · · · · · · · · · · · · · · ·
Weight(net)	: 3.8kg (net)	AM Antenna · · · · · · · · · · · · · · · · · ·
		Operator's manual · · · · · · · · · · · · · · · · · · ·

<sup>\*</sup> For improvement purposes, specifications and design are subject to change without notice.

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## **SAFETY INSTRUCTIONS**

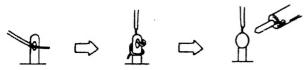
#### PRECAUTIONS DURING SERVICING

- Parts identifide by the (\*)symbol parts are critical for safety. Replace only with parts number specified.
- 2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation.

These must also be replaced only with specifide replacements.

Examples :RF converters, tuner units, antenna selectswitches, RF cables, noise blocking capacitors, noise blocking filters, etc.

- 3. Use specified internal wiring. Note especially:
  - 1) Wires covered with PVC tubing
  - 2) Double insulated wires
  - 3) High voltage leads
- 4. Use specified insulating materials for hazardous live parts. Note especially:
  - 1) Insulation Tape
  - 2) PVC tubing
  - 3) Spacers(insulating barriers)
  - 4) Insulation sheets for transistors
  - 5) Plastic screws for fixing micro switches
- When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



- Make sure that wires to do not contact heat producing parts (heat sinks, oxide metal film resistors, fusible resistors, etc.).
- 7. Check that replaced wires do not contact sharp edged or pointed parts.
- 8. Also check areas surrounding repaired locations.
- 9. Make sure that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

# MAKE YOUR CONTRIBUTION TO PROTECT THE ENVIRONMENT

Used batteries with the ISO symbol for recycling as well as small accumulators (rechargeable batteries), mini-batteries (cells) and starter batteries should not be thrown into the garbage can.



Please leave them at an appropriate depot. All other household batteries can be thrown out with the household waste.

#### SAFETY CHECK AFTER SERVICING

After servicing, make measurements of leakage-current or resistance in order to determine that exposed parts are acceptably insulated from the supply circuit.

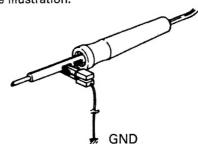
The leakage-current measurement should be done between accessible metal parts (such as chassis, ground terminal, microphone jacks, signal input/output connectors, etc.) and the earth ground through a resister of 1500 ohms paralleled with a 0.15  $\mu F$  capacitor, under the unit's normal working conditions.

The leakage-current should be less than 0.5mA rms AC. The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch (if included) "ON". The resistance should be more than 2.2M Ohms.

#### **PRECAUTIONS IN REPAIRING**

When repairing or adjusting the unit, please note the following points.

- Do not put excessive pressure on the mechanical part (operation part), including the pick-up block, as extremely high mechanical precision is required in these parts.
- When the base is removed for repair adjustment, make sure that there are no metal objects in the narrow gap between the P. C. board or the mecha parts and the base
- 3. The Micro-Computer and the CD signal processing ICs can be damaged by static electricity or leakage from a soldering iron during repairing. While soldering, please take the precautions against leakage as in the illustration.



- Do not loosen any screws in the pick-up block.
   When handing the pick-up block, please refer to the points to NOTE when replacing the pick-up block.
- Keep safety for hazardous invisible Laser Radiation, DO NOT watch the Laser Beam (Objective lens) directly.
- 6. Models for some countries, laser warning labels are affixed on the unit and inside of the unit, as shown below. Read it carefully for your safety, when repairing or adjusting the unit.

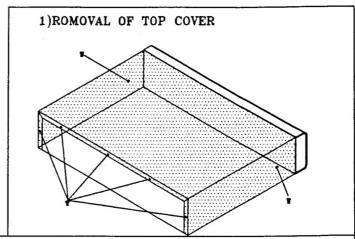
### INFORMATION

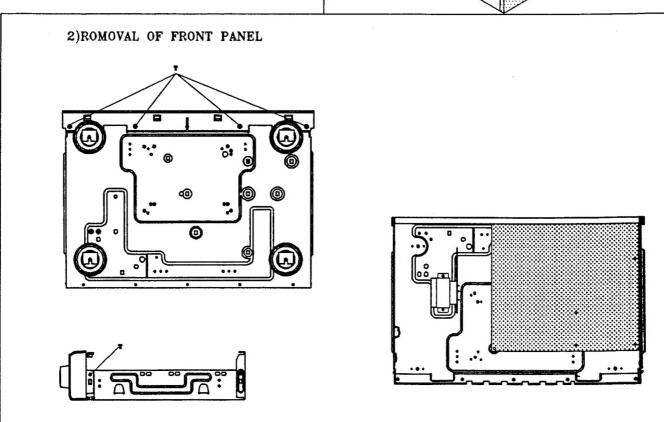
#### SYMBOLS FOR PRIMARY DESTINATION

Primary destination of units are indicated with the following alphabet.

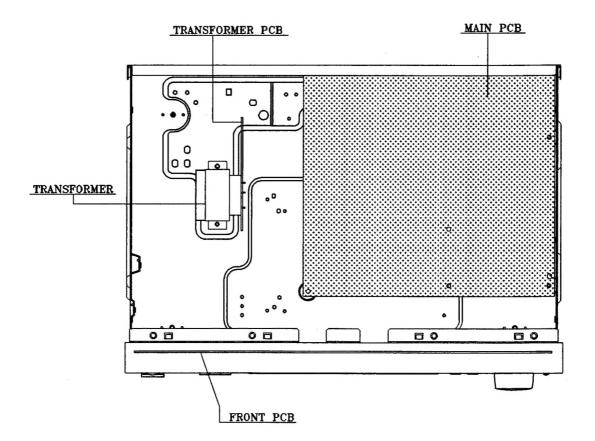
Symbols	Principal Destinations
В	UK
E	Europe (except UK)
S	Australia
U	Universal Area
γ*	Custom version

### **DISASSEMBLY**





## **PRINCIPAL PARTS LOCATION**



#### **■** ALIGNMENT INSTRUCTIONS

#### **EQUIPMENT NEEDED:**

AM Signal Generator
FM Signal Generator
Oscilloscope
VTVM(AC, DC)
Test loop antenna (MW Adjustment)
Dummy antenna (FM Adjustment)
Stereo signal modulator (RDS IN)
Frequency counter
Distortion analyser

#### **IMPORTANT**

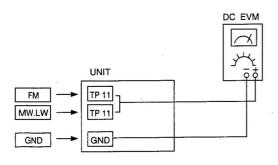
- 1. Check power-source voltage.
- 2. Set the function switch to band aligned.
- 3. Keep the signal input as low as possible to adjust accurately.
- 4. Modulation and modulation frequency.

Item Band	Modulation	Modulation frequency
MW/LW	30%	400Hz
FM	100%(75kHz Dev.)	400Hz

# **MEASUREMENTS AND ADJUSTMENTS**

#### 1. FM, MW/LW TRACKING VOLTAGE ADJUSTMENTS

(FM) DC VOLTMETER ......CONNECT TO TEST POINT TP11 and GND (MW, LW) DC VOLTMETER ......CONNECT TO TEST POINT TP11 and GND

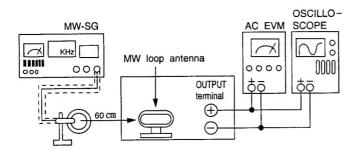


No	Band	Frequency	Adjust for	Adjustment
1	FM	87.50MHz	1.6V	L7
2	MW	522kHz	1V	L204
3	LW	146kHz	1.3V	L205

#### 2. MW/LW RF ADJUSTMENTS

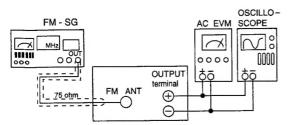
Signal Generator · · · · · · Connects to the MW Ant. Coil through the loop antenna. Adjust for the indication of VTVM of the wave form of scope to be maximum.

BAND	Step	Frequency	Adjust for	Adjustement
	1	612kHz	Maximum sensitivity	L202, T201, T202
MW	2	1503kHz	Mzximum sensitivity	CT21
	3		Repeat steps 1 and 2 several times	
	1	164kHz	Maximum sensivtivity	L203
LW	2	272kHz	Maximum sensitivity	CT22
	3		Repeat steps 1 and 2 several times	



#### 3. FM-RF ADJUSTMENT

Signal Generator······Connect to FM ANT JACK (FM IN) through the dummy.

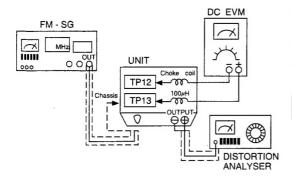


No	Frequency	Adjust for	Adjustment
1	90.10MHz	Maximum Sensitivity	L2, L5, L6
2	F	Repeat step 1 several tim	nes

#### 4. FM MONO DISTORTION ADJUSTMENT

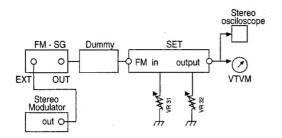
DC VOLT METER · · · · · · Connect to TP12(-), TP13(+) Through the choke coll ( $100\mu$ H) Signal Generator · · · · · · · Connect to FM ANT Jacek (FM IN) through the dummy.

Distortion Meter ······Connect to the output.



No	Frequency	Adjust for	Adjustment
1	100.10MHz	DC Voltmeter 0V	T101
2	100.10MHz	Minimum T. H. D	T102
3	Repeat	steps 1 and 2 Severa	l times.

#### 5. FM STEREO SEPARATION (WIDE/NARROW) ADJUSTMENT



Pilot signal	Adjust for	Adjustment
ON	Different of R and L must be maximum	VR31(WIDE) VR32(NARROW)

NOTE: In case of adjusting the stereo separation, of input is L (or R) channel, R (or L) channel must be maximum.

#### 6. FM/MW(LW) AUTO STOP LEVEL ADJUSTMENT

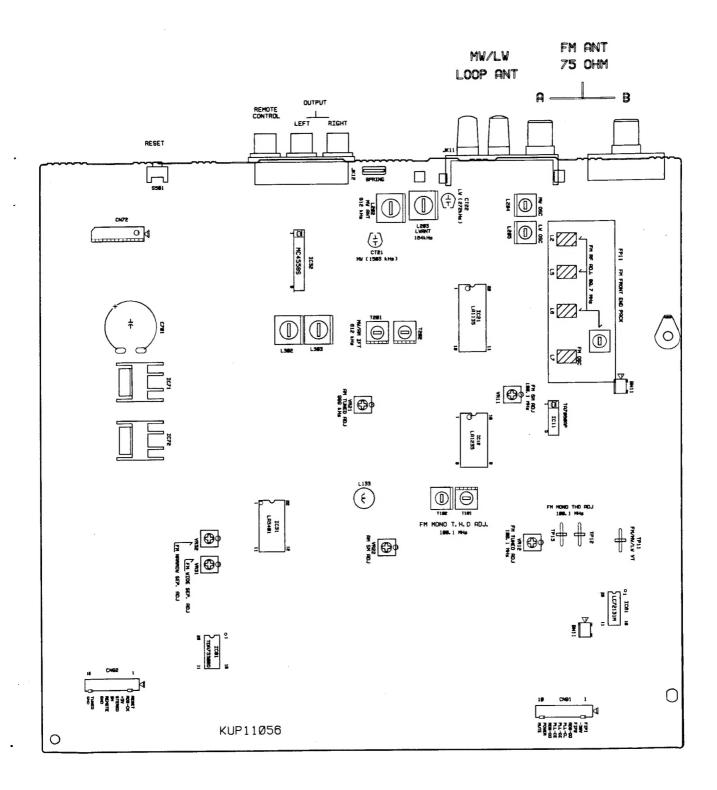
FM SIGNAL GENERATOR · · · · · · Connec to FM ANT Jack(FM IN)through the dummy MW(LW) SIGNAL GENERATOR · · · · · · Connect to MW ANT, Coil through the Loop antenna

BAND	STEP	SIGNAL GENERATOR	Adjust for	Adjustment
	1	100.1MHz 35dB	TUNED Display OFF	VR11
FM	2	100.1MHz 35dB	TUNED Display ON	VR11
B 40 4 / / 1 A / )	1	999kHz 80dB	TUNED Display OFF	VR21
MW(LW)	2	999kHz 80dB	TUNED Display ON	VR21

#### 7. FM/MW(LW) SIGNAL METER LEVEL ADJUSTMENT

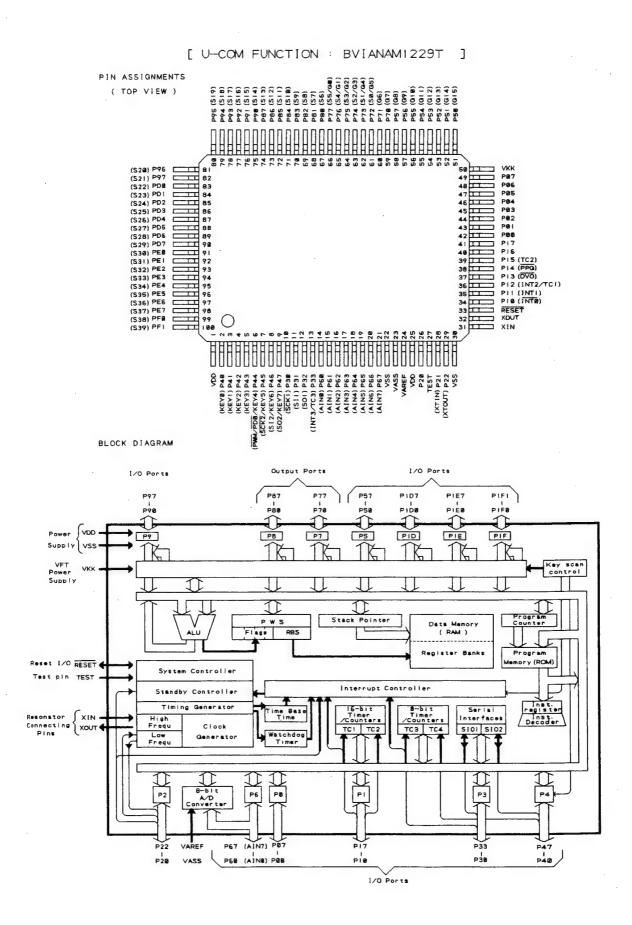
FM SIGNAL GENERATOR · · · · · · · Connect to FM ANT Jack(FM IN) through the dummy MW(LW) SIGNAL GENERATOR · · · · · · · Connect to MW ANT, Coil through the Loop Antenna

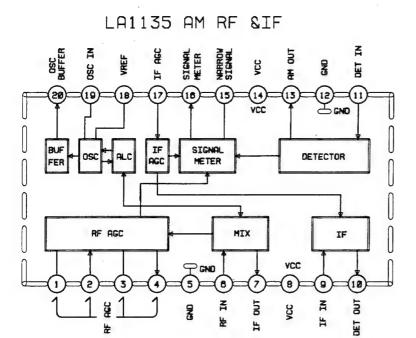
BAND	SIGNAL GENERATOR	Adjust for (signal level)	Adjustment
FM	100.1MHz 66dB	Signal level : 59~61dB FM(ANT A) IN	VR12
MW(LW)	999kHz 100dB	Signal level : 75~80dB	VR22

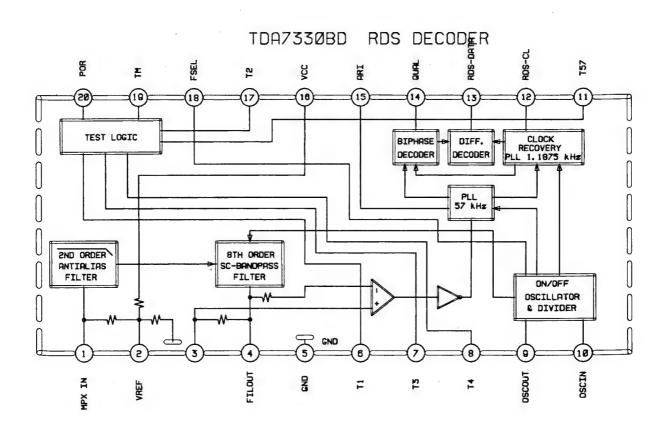


# IC( $\mu$ -COM) PIN FUNCTION

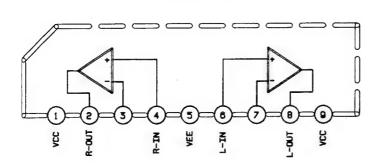
RATOR
ATOR
ATOR
ATOR
CONTROL
TROL

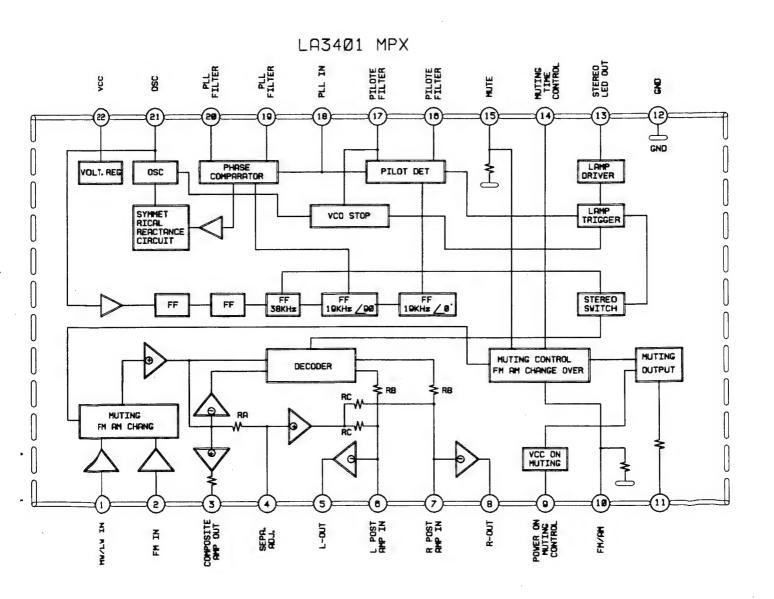


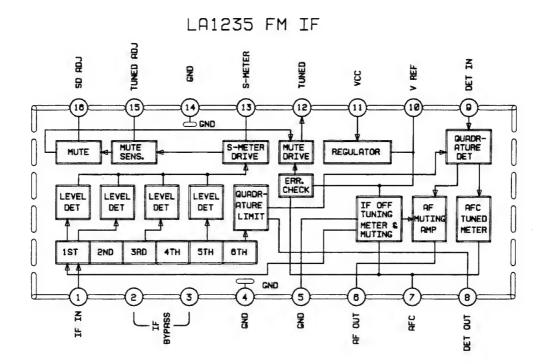


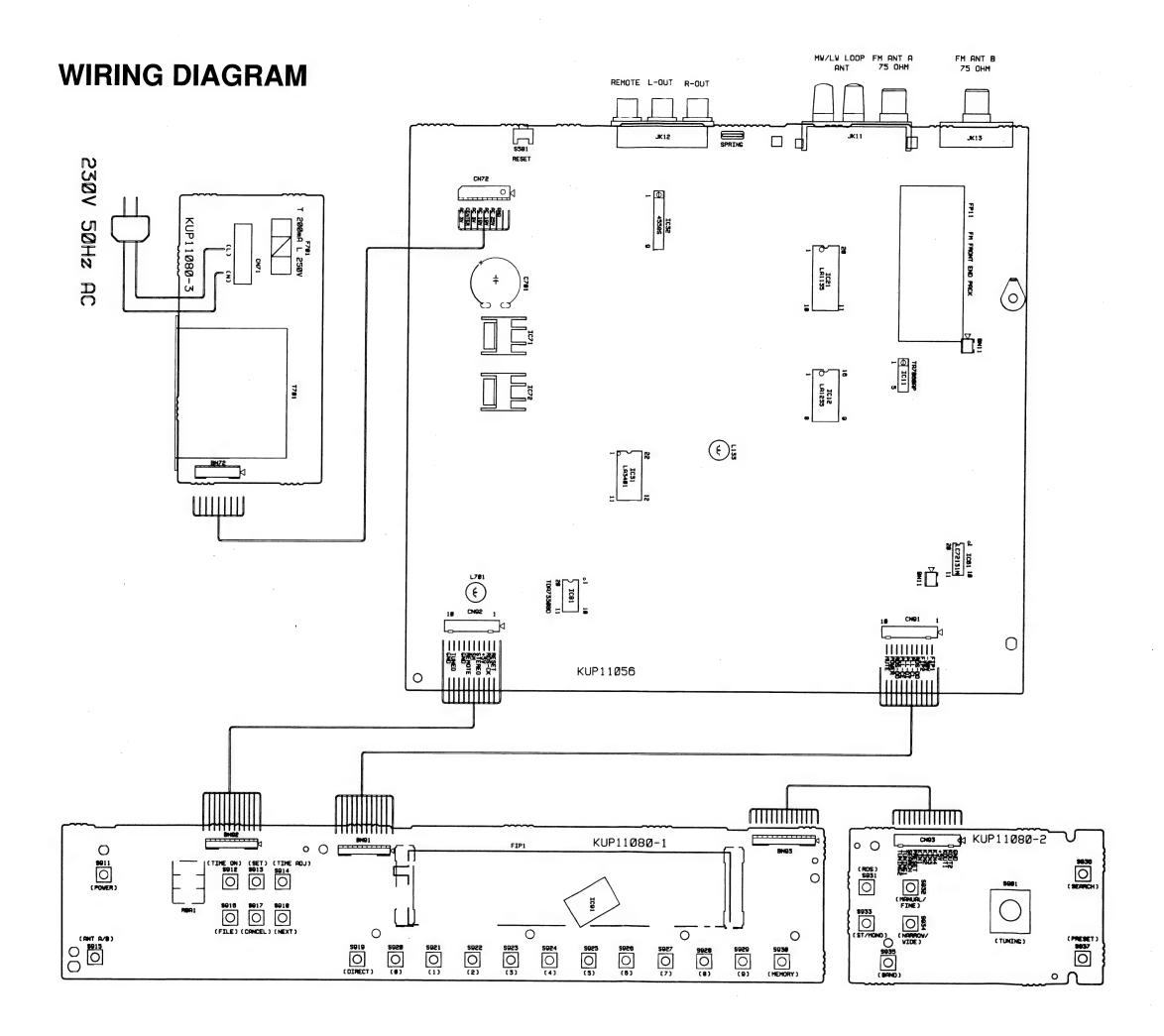


MC4558S

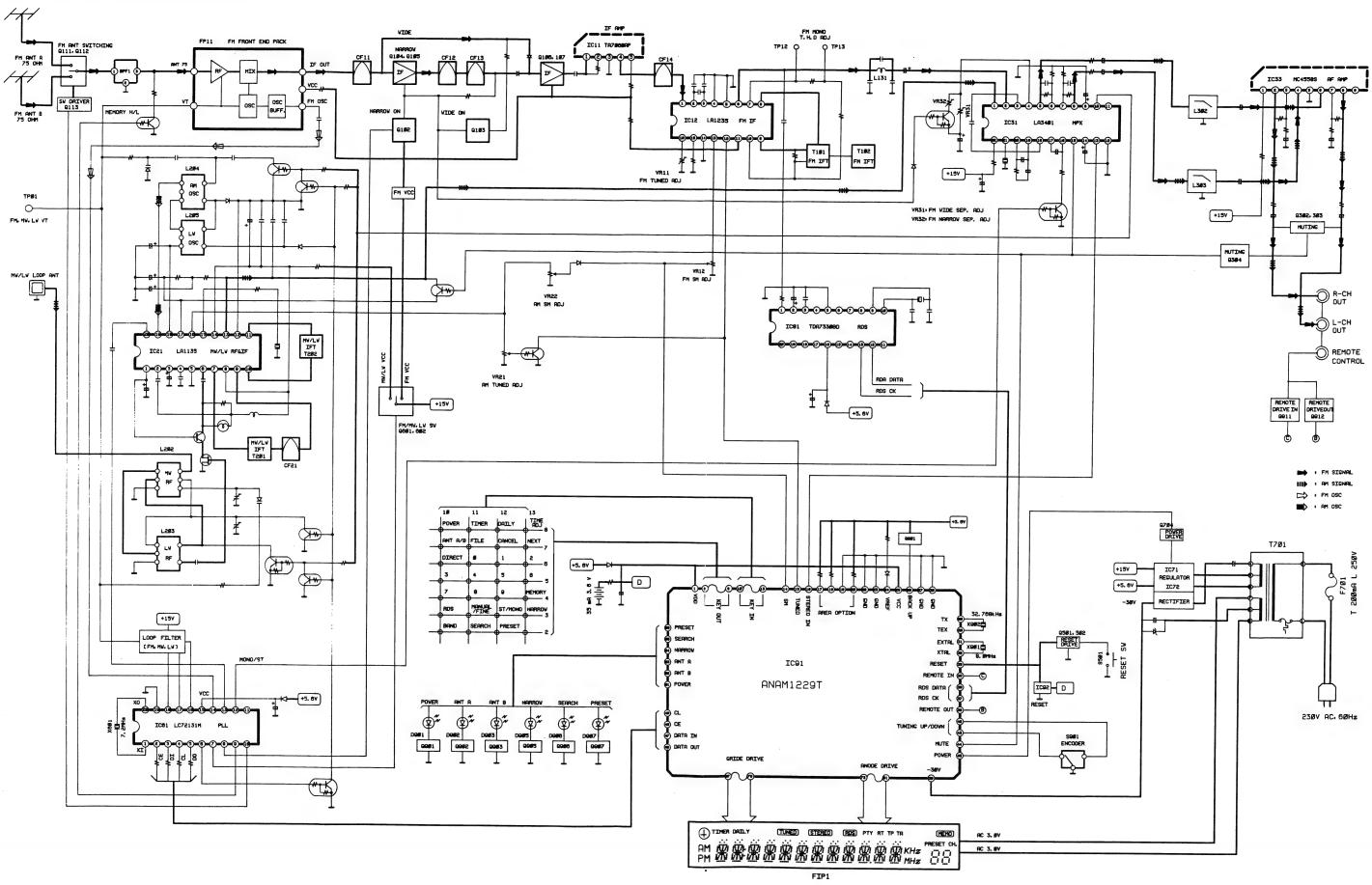




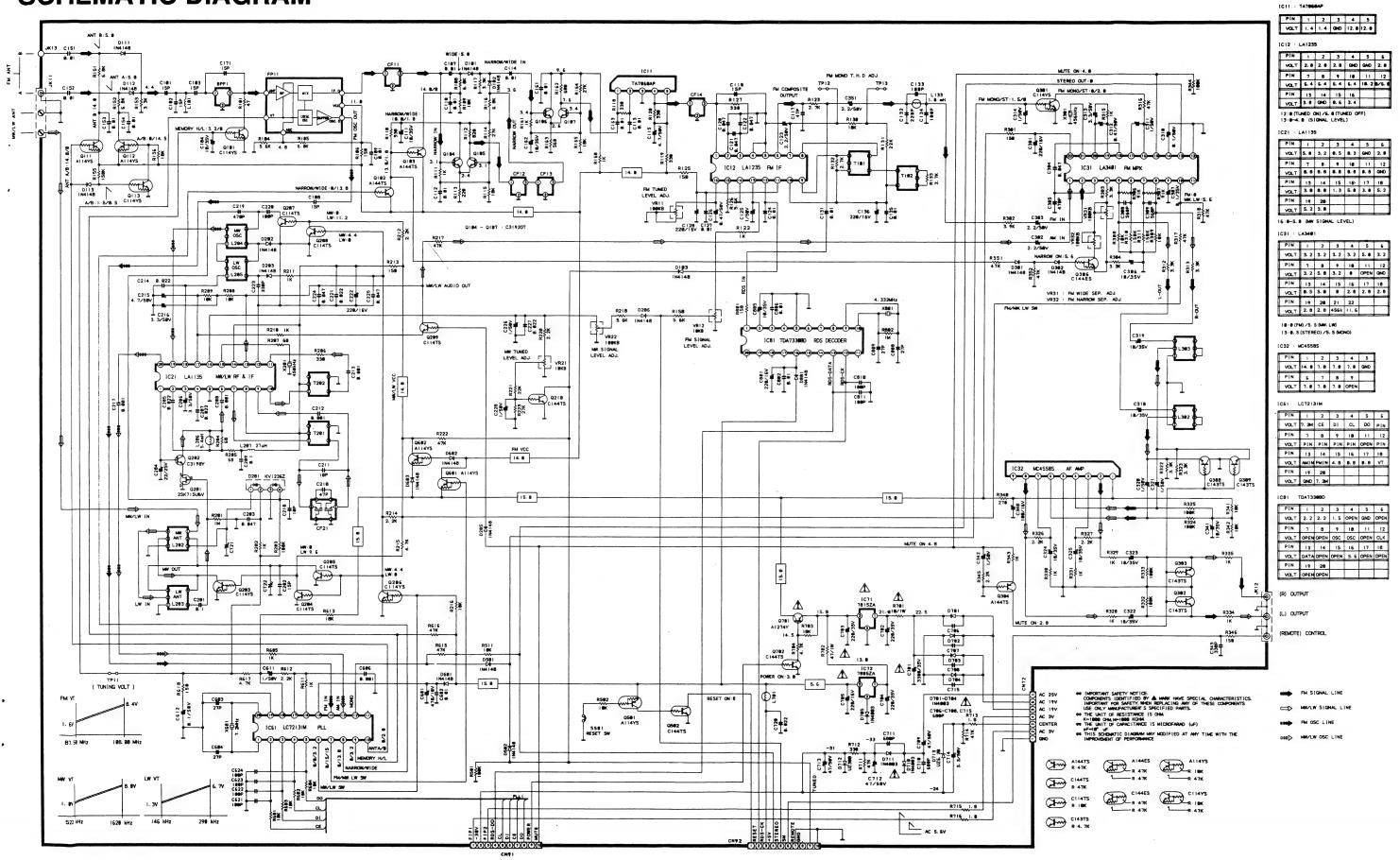


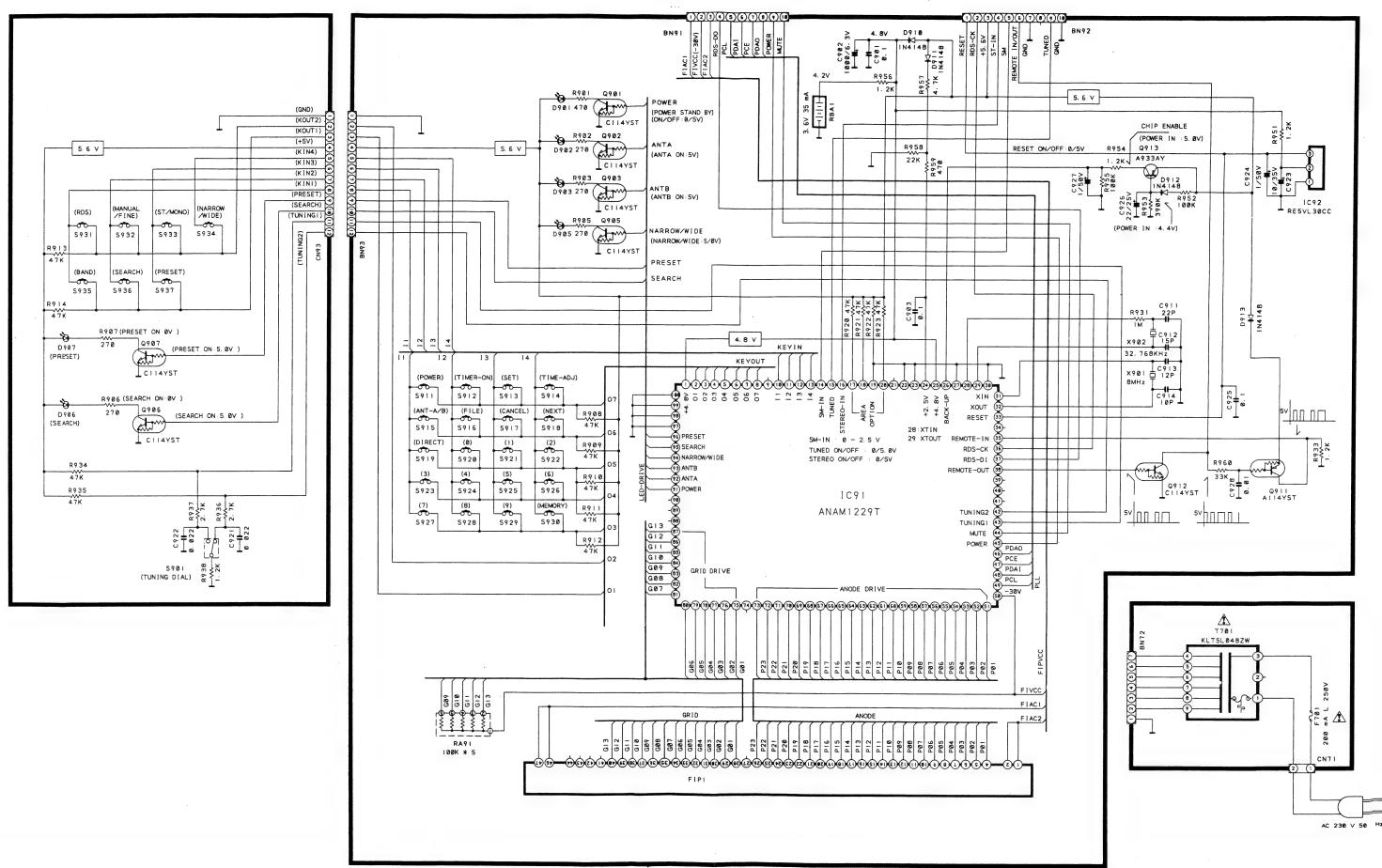


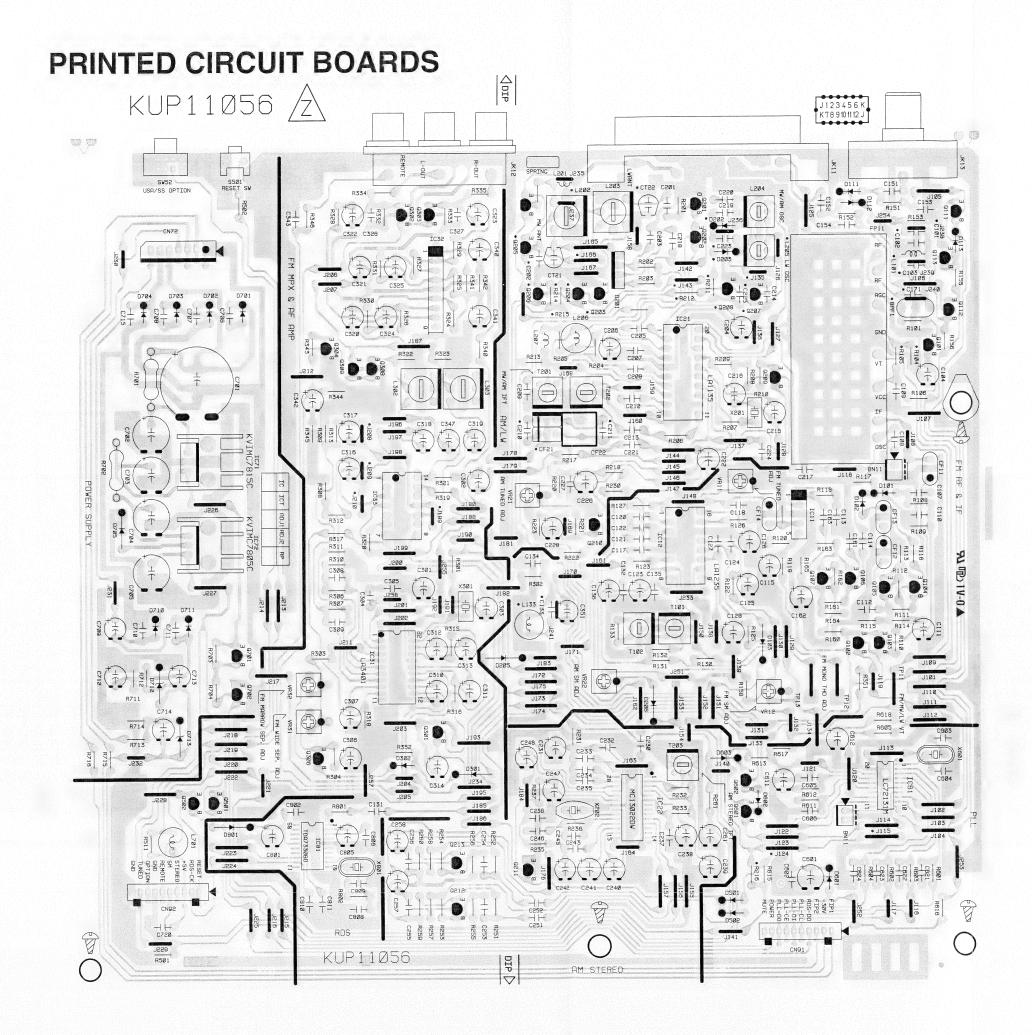
# **BLOCK DIAGRAM**

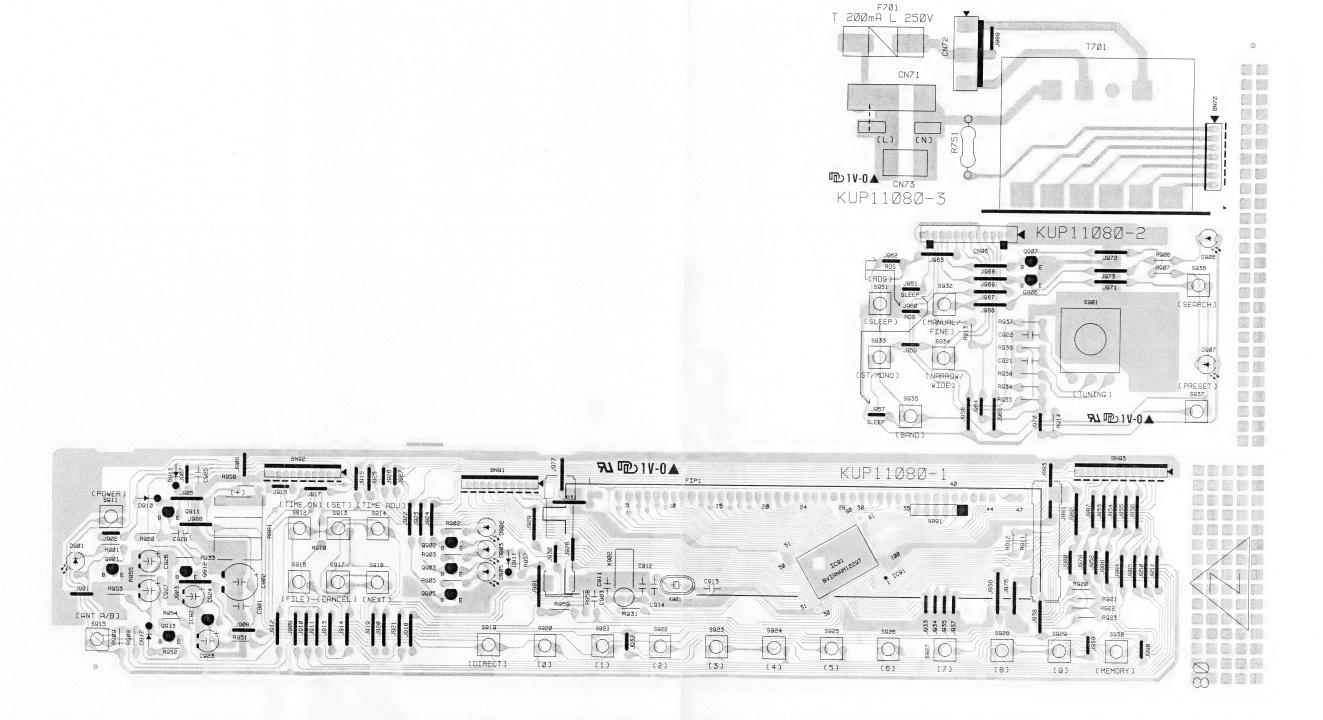


### **SCHEMATIC DIAGRAM**

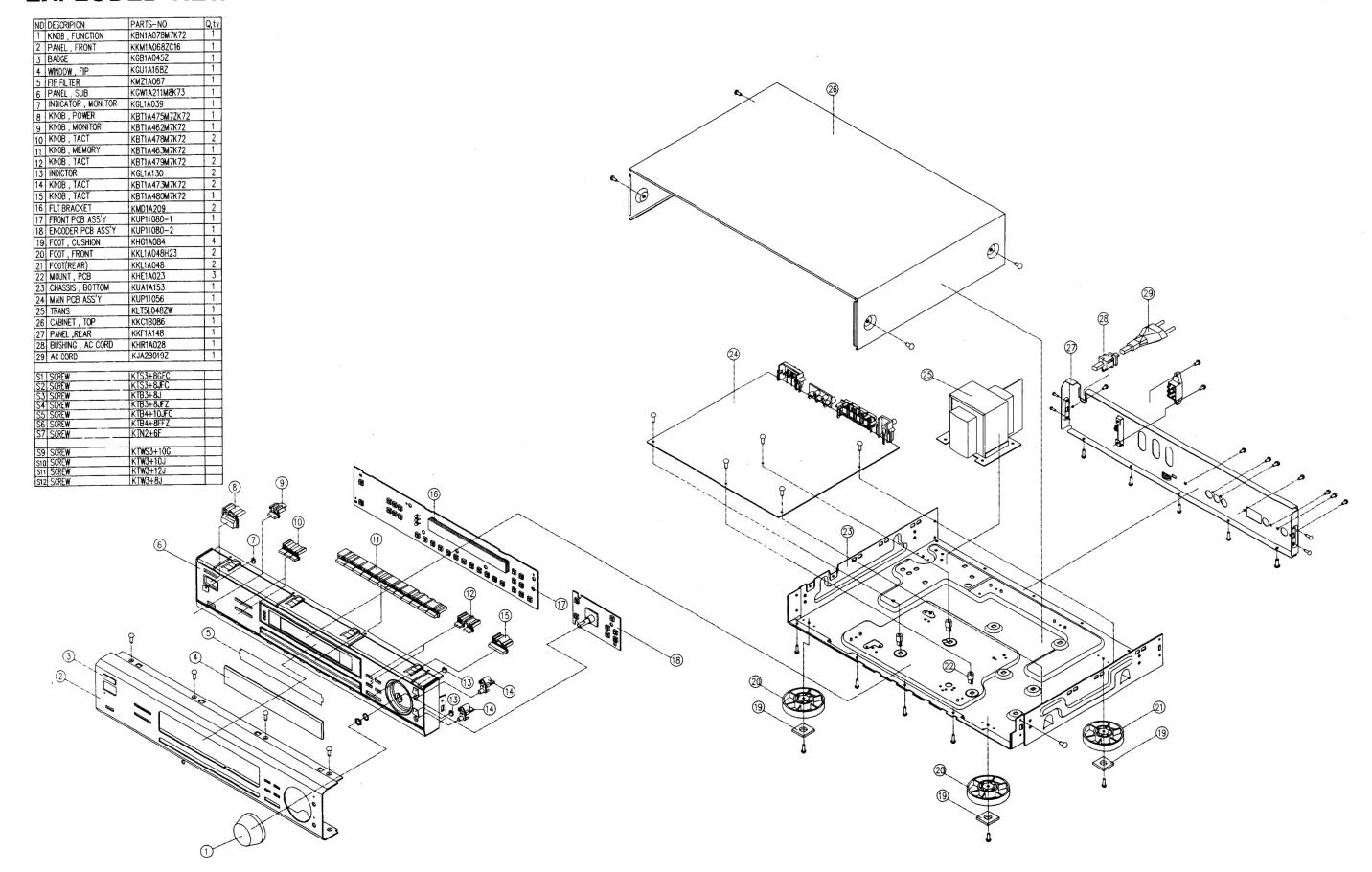








### **EXPLODED VIEW**



### **PARTS LIST**

#### **ATTENTION**

- 1. When placing an order for parts, be sure to list the Part No., Model No. and the description of each part. Otherwise, the non-delivery of the part or the delivery of a wrong part may result.
- 2. Please make sure that Part No. is correct when ordering.
  If not, a part different from the one you ordered may be delivered.
- 3. Since the parts shown in Parts List of Preliminary Service Manual may have been the subject of changes, please use this Parts List for all future reference.

#### **HOW TO USE THIS PARTS LIST**

- 1. This Parts List lists those parts which are considered necessary for repairs. Other common parts, such as resistors and capacitors, are listed in the "Common List for Service Parts" from which these parts should be selected and stocked.
- 2. Parts not shown in the Parts List and "Common List for Service Parts" will not in principle be supplied.
- 3. How to read the Parts List.

#### Resistor and Capacitor

Notes: · Part numbers are indicated for most mechanical parts.

Please use this part number for parts order.

· IMPORTANT SAFETY NOTICE.

Components identified by  $\underline{\wedge}$  mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.

The unit of resistance is OHM( Ω)

K=1000(  $\Omega$  ), M=1000(K  $\Omega$  )

The unit of capacitance is MICROFARAD(μF).

· P=10<sup>-6</sup>μF

# ■ Numbering System of Resistor Example

KRD	25	<u>F</u>	J	101
Туре	Wattage	Shape	Tolerance	Value
		***	1	

Resistor Type	Wattage	Tolerance
KRD:Carbon	20:1/5W	F:=±1%
KRG:Metal Oxide	25:1/4W	J:=±5%
	50:1/2W	K:=±10%
	1:1W	
KRF:Metal Cement	2:2W	
	3:3W	Ì

# ■ Numbering System of Capacitor Example

KCKT	1H	101	K	В
Type	Voltage	Value	Tolerance	Peculiarity

Capacitor Type	Vol	Tolerance	
Capacitor Type	ECEA Type Other		
KCB:Ceramic	OJ:6.3V	1H:50V DC	C:±0.25pF
KCC:Ceramic	1A:10V	1:125V DC	G:±2%
KCK:Ceramic	1C:16V	KC:400V AC	J:±5%
KCFR:Semiconductor	1E:25V		K:±10%
KCQI:Polyester	1H:50V		Z:+80%, -20%
KCQP:Polypropylene	1V:35V		
KCQS:Polystyrol			

#### WARNING

 $\triangle$  (\*) INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS.

#### **AVERTISSEMENT**

 $\triangle$  (\*) IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉDE L'APPAREIL, NE REMPLACER QUE DES PIÉCES RECOMMANDEES PAR LÉ FABRICANT.

#### ■ ELECTRICAL PARTS LIST

REF NO.	PART NO.	DESCRIPTION	REF NO.	PART NO.	DESCRIPTION
P. C	BOARD BLOCK	K PART NO.	D301	KVD1N4148T	DIODE
	Dood No.		D302	KVD1N4148MT	DIODE
	Part No.	Description	D501, 502		DIODE
	KOP11056B	MAIN PCB ASS'Y	D601~D603		
	KOP11080B	FRONT PCB ASS'Y	1	4∆KVD1N4003SRT	DIODE, RECT
MAIN DCD	DI V CONCICTO OF	FOLLOWING P. C. B	D705	KVD1N4003ST	DIODE
WAIN FCB	* MAIN P. C. BOA			∆KVD1N4003SRT	DIODE, RECT
	* IVIAIN F. C. BOA	עא	D712	KVDUZ30BMT	DIODE, ZENER
ERONT POR	RI K CONSISTS OF	FOLLOWING P. C. B	D713	KVDUZ6.2BMT	DIODE, ZENER
THOWITCD	* FRONT P. C. BO		D801	KVD1N4148T	DIODE
	* SUB P. C. BOAR				
	* OOD I . C. DOAN	D .	CF11	BVFE107MX2HAT	FILTER, CERAMIC
	1. MAIN PCB		CF12~CF14	BVFE107MZ2HAT	FILTER, CERAMIC
	II MANETOD		CF21	BVFSFZ450F	FILTER, CERAMIC
IC11	BVITA7060AP	IC, FM IF	İ		
IC12	BVILA1235	IC, FM IF	X201	BVFBFU450C4N	FILTER, CERAMIC
IC21	BVILA1235	IC, FM IF	X301	BVFCSB456F11	RESONATOR, CERAMIC
IC31	BVILA3401	IC, AIVI IF	X601	KOX07200A200C	CRYSTAL
IC32	KVIMC4558S	IC, IVIPA	X801	KOX04332A200C	CRYSTAL
IC61	BVILC72131M	IC, PLL	BN11	KWZAT1200AK05	WIRE ASS'Y
	KVIMC7815CZA	IC, PLL IC, ASS'Y			
	KVIMC7815CZA KVIMC7805CZA		JW11	KWE8202040AA	WIRE
IC72		IC, ASS'Y	JW12	KWZNT20001	WIRE ASS'Y
ICOI	BVITDA7330BD	IC, RDS DECODER			
Q101	KVTDTC114YST	TD	CN72	KJP07GA01ZM	WAFER
Q102, 103		T.R	CN91, 92	KJP10GA19ZM	WAFER
	KVTDTA144TST KVTKTC3192OT	T.R	CT21, 22	KCRA020S12	CAP, VARIABLE
		T.R	I .	KCEA1VH332E	CAP, ELECT
Q111, 112 Q113	KVTDTA114YST	T.R	FP11	KNVFTA4460H	FM FRONT END PACK
Q201	KVTDTC114YST	T.R			THE TABLE
Q202	BVTKTK715T KVTKTC3198YT	F.E.T	JK11	KJJ3S006Z	TERMINAL, ANT
Q202		T.R	JK12	KJJ4S003V	TERMINAL, OUTPUT 3P(SIL, BLK)
Q204, 205	KVTDTC114YST	T.R	JK13	BJJ3G001Z	TERMINAL FM ANT (75 OHM)
Q204, 205	KVTDTC114TST	T.R			remains terminate (10 of all)
	KVTDTC114YST	T.R	R701 △	KRG1ANJ100H	RES, METAL OXIDE FILM
	KVTDTC114TST	T.R		KRG1ANJ470H	RES, METAL OXIDE FILM
Q210	KVTDTC144TST	T.R	S501	KST1A010Z	SW, TACT
Q301	KVTKVTDTC114YS		BPF1	KVFBPMB8	B.P.F
Q302, 303 Q304	KVTDTC143TST	T.R			J., .,
	KVTDTA144TST	T.R	T101	KLI3B024Z	FM, IFT1
Q306	KVTDTC144EST	T.R	T102	KLI3B025Z	FM, IFT2
Q308, 309	KVTDTC143TST	T.R	T201	KLI2B108Z	I.F.T, AM1
Q501	KVTDTA114YST	T.R	T202	KLI2B109Z	I.F.T, AM2
Q502	KVTDTC144TST	T.R	T302, 303	KLM5B2-T	COIL, MPX
Q601, 602	KVTDTA114YST	T.R	.002,000	NEIVIOUZ- I	COIL, IVIF A
	KVTKTA1274YT	T.R	L101	KLA4Y106Z	COIL, FILTER
Q702	KVTDTC144TST	T.R	L151	KLQA183KW	COIL, FILTER
D404 455	10.05.41	I	L202	KLA2C004	COIL, AM ANT1
D101, 102	KVD1N4148MT	DIODE	L202	KLA2C004 KLA1B005	
D103	KVD1N4148T	DIODE	L203		COIL, LW ANT
	KVD1N4148MT	DIODE	L204 L205	KLO2B010	COIL, AM OSC
D201	KVDKV1236	DIODE AM VARICAP		KLO1B006	COIL, LW OSC
D202, 203	KVD1N4148MT	DIODE	L206 L701	KLQB542KLZ KLQB101KLZ	COIL COIL, INDUCTOR
D202, 203 D205, 206	KVD1N4148T				

REF NO.	PART NO.	DESCRIPTION	REF NO.	PART NO.	DESCRIPTION
VR11 VR12 VR21	BVN1PA104B01T BVN1PA103B01T	RES, SEMI FIXED RES, SEMI FIXED			
VR22 VR31, 32	BVN1PA104B01T	RES, SEMI FIXED			
	2. POWER PCB				
BN72 F701	KLT5L048ZW KWZAT1200AK01 KJCFC5S KBA2C0200TLE	TRANS POWER WIRE ASS'Y HOLDER, FUSE FUSE (T200mA L250V)			
	3. FRONT PCB		:		,
IC91 IC92	BVIANAM1229T BVIRE5VL30CARZ	IC, μ-COM VOLTAGE DETECTOR			
Q901~Q907 Q911	KVTDTC114YST KVTDTA114YST	T.R T.R			
Q912 Q913	KVTDTC114YST KVT2SA933SRT	T.R T.R			
			-		
D902, 903	KVD342VCF02T085 KVD342MCF02T085				
D905~D907 D910~D913	KVD1N4148MT	DIODE			
S911~S937	KST1A012ZT	SW, TACT			
BN91 BN92 BN93	KWZAT1200AK02 KWZAT1200AK03 KWZAT1200AK04	WIRE ASS'Y WIRE ASS'Y WIRE ASS'Y			:
CN71 CN93	KJP02GA61ZP KJP12GA19ZP	WAFER WAFER			
FIP1	BFLFIP13AM7R	F.I.P			
RA91 RBA1	KRGSN5X104J BABGP35BVT3A3H	RES, NETWORK BATTERY, RECHARGEABLE			
X901	KOX08000E160C	CRYSTAL			
X902 S901	BOX00032A120C BSR2A007Z	VR, ENCODER			
	4. ACCESSORIE	S			
	KJS4M014Y	CORD, REMOTE CONTROL			
	KSA1A007	ANT, FM WIRE(75 Ω)			
	KSA1A008Z	ANT, AM LOOP			
·					
X902	BOX00032A120C BSR2A007Z  4. ACCESSORIE  KJS4M014Y  KJS4N001Y	CRYSTAL VR, ENCODER  ES  CORD, REMOTE CONTROL CORD, AUDIO SIGNAL			

# AKAI